

REMARKS

Claims 1, 4, 5, 7, 11-14, 19, 24, 25, 26, and 30-41 are pending. No new matter is added by the amendments to the claims, as there is full support for the amendments in the specification and drawing. With regard to the amendment “mounted on top of, and” in claims 1, 19, 32, and 35, see at least Applicant’s specification at page 11, lines 6-8, original claim 6, and Figure 1. Consideration and allowance of the claims, as amended, are requested for the reasons discussed below.

The §112 Rejection

The Examiner rejected claims 32-41 under §112, first paragraph, as failing to comply with the written description requirement. In support of his position, the Examiner stated in part:

There is no support anywhere in the originally filed disclosure, claims, or drawings, for the limitation in the independent claims 32 and 35 that the first and second modules contain groups of components, in addition to or separate from the conduits contained and required for fluid communication with the modules. The only mention of components is of the distillation columns of the first and second modules and the ability of the modules to communicate fluidly with other modules (page 6, parag. 2).

Contrary to the Examiner’s contention, there is full support in the specification and the original claims for the limitations to which the Examiner has objected. Specifically, see page 9, lines 4-10 (... the components... positioned adjacent to each other in their required positions relative to the first distillation column module ...); page 12, lines 4-9 (... upstream and downstream components...); and original claims 20 and 22 (“other components,” *i.e.*, other than “each distillation column”). See also, page 4, lines 25-28; and page 5, line 33 to page 6, line 15; page 7, lines 18-23; and page 8, line 28 to page 9, line 2. Accordingly, the §112 rejection of claims 32-41 should be withdrawn.

The §103 Rejections

The Examiner rejected claims 1, 11, 19, 25-26, 30-32, 34-39, and 41 under §103 as being unpatentable over Guillard (FR 2 780 147) in view of Robert et al. (EP 1 314 942).

In discussing his position in support of this rejection, the Examiner first focused on claims 1, 19, 25, and 30. Claim 1 is the only independent claim of those four claims, and claims 19, 25, and 30 each depend from independent apparatus claim 1.

Guillard is significantly different than Applicant's apparatus as claimed in independent claim 1. Contrary to the Examiner's suggestion, the first module, second module, and heat exchange module of Guillard are not "immediately adjacent" and are not "attached directly to" each other like Applicant's self-contained modules in independent claim 1. Rather, as shown in Figure 1 of Guillard, there is a substantial space between cold box 14 and cold box 15, and there also is a substantial space between cold box 15 and cold box 13. Those substantial spaces are also shown in Figures 2A through 2E, as well as in Figures 6A-6C and Figures 7 – the very figures which the Examiner relies on in support of his position.

By comparison, Applicant's Figure 1, which illustrates one embodiment of Applicant's claimed apparatus, shows that there is no space between the exchange module 12 and the first distillation column 14, nor is there any significant space between the first distillation column 14 and the second distillation column module 16. See also Applicant's application at page 11, lines 6-8 (stating that the second distillation column 16 is "mounted on the top of" the first distillation column module 14). See also page 11, lines 12-33 stating that each of the other modules of Applicant's apparatus are "mounted on" and "adjacent to" one of the other modules of the apparatus.

Although the separated modules of Guillard are “connected” by conduits, they are not “attached directly to” each other like the immediately adjacent modules in Applicant’s claimed apparatus of independent claim 1.

In addition to those important differences between Guillard and Applicant’s claimed apparatus, there is another very significant distinguishing feature. Not only is Applicant’s second self-contained distillation column module immediately adjacent to and attached directly to the first distillation column module, but it is also mounted on top of the first distillation column module (as stated in amended independent claim 1). That key feature is not disclosed or taught by Guillard.

In fact, Guillard teaches away from that key feature of Applicant’s apparatus of independent claim 1. See the following passage on page 2 of Guillard¹:

The substantial height of double distillation columns with structured packing, for example of the order of 60 m, presents numerous problems.

Thus, constructing them as packages that are pre-assembled at the factory and intended to be transported to the industrial site of the plant **may prove to be difficult or even impossible**.

Moreover, erecting these double columns on site entails the use of heavy lifting gear and the implementation of special safety measures to safeguard personnel, particularly on account of the heights at which they have to work.

In addition, the ability of these erected double columns surrounded by their thermal-insulation walls to withstand the effects of wind and earthquakes requires the implementation of expensive means.

¹ All references herein to the text of Guillard refer to the second English translation, which is numbered Page 1 to Page 22 and was submitted with Applicant’s IDS dated June 3, 2009.

Lastly, the dimensions of these erected double columns generate problems of non-uniform thermal expansion when exposed to sunlight. (Emphasis added).

In an attempt “to resolve these problems,” Guillard designed an air distillation plant comprising at least two assemblies arranged side-by-side, rather than one on top of the other as in Applicant’s claimed invention. In addition, whereas Applicant’s claimed apparatus of independent claim 1 includes a high pressure cryogenic distillation column and a low pressure cryogenic distillation column, Guillard uses a medium-pressure column and a low-pressure column.

Since Guillard teaches away from Applicant’s claimed apparatus, a person skilled in the art would not combine Guillard with Robert et al., or with any other prior art reference, to arrive at Applicant’s claimed apparatus in independent claim 1.

One of Applicant’s motivations which resulted in his design of mounting one module on top of the other was the desire to “reduce the ground area taken up by the footprint of the air separation plant.” Applicant’s application at page 3, lines 8-11. Guillard was not concerned with reducing the ground area taken up by the footprint of an air separation apparatus (as seen with his side-by-side arrangement of modules). Accordingly, a person skilled in the art looking for a solution to the difficulties associated with the restrictive space that typically exists at the erection site for an air separation plant would not be inclined to consider Guillard.

Also, by positioning the self-contained modules of Applicant’s claimed apparatus immediately adjacent each other and using direct attachment of adjacent modules as in amended claim 1 (and using cross-over structures as in claims 33, 34, 40, and 41), the structural integrity of the fully assembled unit is increased significantly, thereby reducing the risk that the apparatus

will be damaged (*e.g.*, by buckling) when the fully assembled unit is transported a substantial distance and erected at the distant site. This significantly increased structural integrity of the fully assembled unit due to the arrangement of the modules is not taught or disclosed by Guillard.

Persons skilled in the art would not even consider transporting the apparatus shown in Figure 1 of Guillard as a single unit in view of the significant space between the cold boxes 13, 14, and 15. The lack of structural integrity of such an apparatus would mean a significant risk of potential damage during any attempted transportation of the apparatus from a first location to a second location at a substantial distance from the first location. In addition, the apparatus of Guillard includes various components which are not even integrated in a cold box (module) and are separated from cold box 15, such as compressor 8, and apparatus 7, as shown in Figure 1 of Guillard. This scattered arrangement of major elements of the apparatus (plant 1) further supports the position that the apparatus of Guillard cannot be transported and erected safely (*i.e.*, without damage to the apparatus) as a single pre-assembled fully assembled unit like Applicant's apparatus of amended independent claim 1.

In fact, Guillard does not teach transporting his apparatus as a single pre-assembled fully assembled unit from one location to a distant site for a cryogenic air separation plant. To the contrary, Guillard teaches that "each" of the cold boxes 13, 14, and 15 is prefabricated at the factory and then transported to the site (as three separate cold boxes) where a minimum number of operations are performed to complete construction of the plant 1. See the last paragraph at the bottom of page 7 of Guillard. See also the first paragraph at the top of page 8 of Guillard referring to installing each of "them" (the 3 cold boxes) on-site and "ensuring that the cold boxes

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installed on-site....” Claim 26 of Guillard also makes clear that each cold box is built at the factory and intended to be transported separately to the construction site.

Therefore, in addition to the fact that Guillard does not disclose all of the self-contained modules immediately adjacent to and attached directly to each other as in Applicant’s claimed apparatus (*i.e.* arranged as in amended claim 1), Guillard also does not teach or disclose the following limitations of amended independent claim 1:

wherein said fully assembled unit is adapted to be transported as a single pre-assembled fully assembled unit from a first location to a second location at a substantial distance from the first location, and
wherein the transported single pre-assembled fully assembled unit is adapted to be erected as the fully assembled unit at a site for a cryogenic air separation plant designed to produce at least 2000 metric tons/day of a gas product. (Emphasis added).

The entire apparatus of Guillard is not adapted to (or designed to) be transported as a single pre-assembled unit from a first location to a second location at a substantial distance from the first location, nor is it adapted to (or designed to) be erected as a single pre-assembled unit at a site for a cryogenic air separation plant designed to produce at least 2000 metric tons/day of a gas product. Accordingly, there are structural differences between the apparatus of Guillard and Applicant’s apparatus as claimed in amended independent claim 1. *See, In re Venezia*, 530 F.2d 956, 959, 189 USPQ 149, 152 (CCPA 1976) (limitation “adapted to be positioned” served to precisely define present structural attributes of interrelated component parts of claimed assembly), cited in MPEP 2173.05(g).

It is the arrangement of the elements of Applicant’s apparatus (*i.e.*, arranged as in amended claim 1) which provides the structural differences. In other words, Applicant’s claimed apparatus is adapted to be transported as a single pre-assembled unit and is adapted to be erected

as a single pre-assembled unit because of the way that the self-contained modules are positioned (*i.e.*, immediately adjacent to each other) and are attached directly to each other (as in amended claim 1). Therefore, there are multiple structural differences between Applicant's claimed apparatus and the apparatus disclosed in Guillard.

As discussed above, Guillard does not teach or disclose all of the elements and limitations of amended independent apparatus claim 1 arranged as in the claim of independent claim 1.² Robert et al. does not cure the deficiencies of Guillard since Robert et al. also does not teach or disclose the elements and limitations of independent claim 1, as amended, which are not disclosed by Guillard.

For all of the above reasons, Applicant's apparatus of amended independent claim 1 is not obvious, and claim 1, as amended, should be allowed.

Since independent apparatus claim 1, as amended, is non-obvious under §103, all of the dependent claims (including dependent claims 4, 5, 7, 11, 12, 13, 14, 19, 24, 25, 26, 30, and 31) which depend from independent apparatus claim 1, as amended, also are non-obvious. *In re Fine*, 837 F.2d 1071, 1076, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988). Accordingly, dependent claims 4, 5, 7, 11, 12, 13, 14, 19, 24, 25, 26, 30, and 31, all of which were rejected under §103 as being unpatentable over Guillard in view of one or more of the other cited references, are non-obvious and should be allowed, as amended, together with amended independent claim 1.

Independent apparatus claim 32 and independent apparatus claim 35 also were rejected under §103 as being unpatentable over Guillard in view of Robert et al. For the same reasons

² To establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (C.C.P.A. 1974).

discussed above with respect to independent claim 1, claims 32 and 35, as amended, also are not obvious.

Since independent claims 32 and 35 are non-obvious under §103, all of the dependent claims which depend from those independent claims also are non-obvious. *In re Fine, supra*. Accordingly, dependent claims 33 and 34 which depend from independent claim 32 are not obvious, and dependent claims 36-41 which depend from independent claim 35 also are non-obvious. Therefore, each of those dependent claims (33, 34, and 36-41) should be allowed together with amended independent claims 32 and 35.

The Examiner also rejected claims 1, 7, 11, 13, 14, 19, 24-26, and 30-41 under §103 as being unpatentable over Guillard in view of Bracque, et al. (U.S. Patent No. 5,461,871) [hereinafter Bracque (871)]. For the reasons discussed above with regard to Guillard and the reasons discussed below with regard to Bracque (871), all of said claims are non-obvious and should be allowed.

First, for the reasons previously discussed with regard to Guillard, a person skilled in the art would not combine Guillard with Braque (871) or any other prior art reference to arrive at Applicant's apparatus of independent claim 1. As discussed above, Guillard does not teach or disclose all of the elements and limitations of amended independent apparatus claim 1 arranged as in the claim.³ Bracque (871) does not cure the deficiencies of Guillard, since Bracque (871) also does not teach or disclose the elements or limitations of independent claim 1, as amended, which are not disclosed by Guillard.

³ See footnote 2, *supra*.

Furthermore, Applicant notes that the language in Bracque (871) at column 1, lines 11-18 suggests that this reference also “teaches away” from Applicant’s claimed apparatus of amended independent claim 1. Specifically, the first sentence of that passage states: “It has been proposed to preassemble in the factory all of the installation, except the air compressor group and the cylinders for the purification of air by adsorption.” (Emphasis added). This statement makes clear that the apparatus disclosed by Bracque (871) does not teach or disclose a fully assembled unit adapted to be transported as a single pre-assembled fully assembled unit, which is adapted to be erected at a site for a cryogenic air separation plant. Accordingly, a person skilled in the art would not combine Bracque (871) with Guillard, which also teaches away from Applicant’s claimed apparatus, as discussed above.

Therefore, since a person skilled in the art would not combine Bracque (871) with Guillard, Applicant’s claimed apparatus of amended independent claim 1 is not obvious over the combination of those two references. Furthermore, as indicated above, Bracque (871) does not cure the deficiencies of Guillard, and the combination of the two references therefore does not teach all of the elements and limitations of amended independent claim 1 arranged as in that claim.

For all of the above reasons, Applicant’s apparatus of amended independent claim 1 is not obvious in view of Guillard and Bracque (871), and claim 1, as amended should be allowed.

Since independent apparatus claim 1, as amended, is non-obvious under §103, all of the dependent claims (including dependent claims 7, 11, 13, 14, 19, 24-26, 30 and 31, all of which depend from independent apparatus claim 1, as amended), also are not obvious. *In re Fine*,

supra. Accordingly, all of said claims which were rejected under §103 as being unpatentable over Guillard in view of Bracque (871) should be allowed, as amended.

With regard to dependent claims 7, 24, 33, and 40, the Examiner asserts that the “first cross-over structure” required in those claims is “inherent to operation as such is interpreted as a connecting structure that permits fluids to cross-over from one module to another.” Applicant respectfully disagrees. The term “cross-over structure” as used in dependent claims 7, 24, 33, and 40 is discussed in Applicant’s specification at page 11, lines 12-15 and 27-30, and is illustrated in Figure 1. That structure is significantly different than what is suggested by the Examiner.

Moreover, a review of claim 33 and claim 32 (from which claim 33 depends) makes clear that the first cross-over structure and the conduits of the claimed apparatus are separate elements. In other words, a cross-over structure is not, as the Examiner suggests, a conduit or other structure that permits fluids to cross-over from one module to another.

Independent apparatus claim 32 and independent claim 35 also are non-obvious in view of the combination of Guillard and Bracque (871) for the same reasons discussed above with respect to independent claim 1. Accordingly, independent claims 32 and 35 also should be allowed. The dependent claims which depend from independent claims 32 and 35 also are not obvious in view of the combination of Guillard and Bracque (871) for the same reasons discussed above with respect to the dependent claims depending from claim 1. Since independent claims 32 and 35 are non-obvious under §103, all of the dependent claims (including dependent claims 33, 34, and 36-41) which depend from independent claims 32 and 35 also are non-obvious. *In re Fine, supra*.

The Examiner also rejected dependent claims 4-5 under §103 as being unpatentable over Guillard in view of Robert and further in view of Bracque et al. (U.S. Pat. No. 5,349,827) [hereinafter Bracque (827)]. For the reasons discussed above with regard to Guillard and the reasons discussed below with regard to Bracque (827), Applicant's apparatus claimed in dependent apparatus claims 4-5 is not obvious in view of the cited references.

In support of the rejection of dependent apparatus claims 4 and 5, the Examiner stated in part: "Guillard teaches all of the claim limitations of claims 4-5, but does not explicitly teach that the diameter of the columns (2, 3) is over 3.5 meters or about 5 or 6 meters (16-19 feet)." The Examiner then explains how, according to his position, said missing teaching (column diameter size) would have been obvious to one of ordinary skill in the art at the time Applicant's invention was made in view of distillation column setting diameters of about 5 meters as taught by Bracque (827).

However, Guillard does not teach all of the other claim limitations of amended dependent apparatus claims 4 and 5. As discussed above, Guillard does not teach or disclose several limitations of amended independent apparatus claim 1 arranged as in the claim. Bracque (827) does not cure the deficiencies of Guillard, since Bracque (827) also does not teach or disclose all of the limitations of amended independent claim 1, arranged as in the claim, which are not disclosed by Guillard. Accordingly, dependent apparatus claims 4 and 5, as amended, (which claims depend from amended independent claim 1) are not obvious in view of the combination of Guillard with Bracque (827), and should be allowed.

The Examiner also rejected dependent claims 4-5 under §103 as being unpatentable over Guillard, Bracque (871), Robert, and further in view of Bracque (827).

However, for the reasons previously set forth above with respect to the first three of those four references, dependent claims 4 and 5 are non-obvious. Bracque (827) does not cure the deficiencies of the three-reference combination above (Guillard, Bracque (871), and Robert) and the combination of the four references (including Bracque (827)) therefore does not teach all of the limitations of amended independent claim 1 arranged as in that claim, nor does the four-reference combination teach all of the limitations of dependent claims 4 and 5.

The Examiner also rejected dependent apparatus claim 12, which depends from independent claim 1 (as dependent claim 11 from which claim 12 depends, depends from claim 1), as being unpatentable over Guillard in view of Robert and further in view of Zarate, et al. (U.S. Pat. No. 4,957,523). For the reasons discussed below, Applicant's apparatus claimed in dependent apparatus claim 12 is not obvious in view of the cited references.

In support of the rejection of dependent apparatus claim 12, the Examiner stated in part: "Guillard teaches most of the limitations of claim 12, including that the air purification unit purifies the air of water and CO₂ (page 6, parag. 8) but does not explicitly teach that the air purification unit (4) comprises at least two air purification vessels arranged in parallel, each vessel comprising at least one bed of carbon dioxide and/or water adsorbent material." The Examiner then explains how, according to his position, said missing teaching (purification system) would have been obvious to one of ordinary skill in the art at the time Applicant's invention was made in view of the air purification system taught by Zarate.

However, Guillard does not teach all of the other claim limitations of dependent apparatus claim 12. As discussed above, Guillard does not teach or disclose several of the limitations of amended independent apparatus claim 1 arranged as in the claim. Zarate does not

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cure the deficiencies of Guillard, since Zarate also does not teach or disclose all of the limitations of amended independent claim 1, arranged as in the claim, which are not disclosed by Guillard. Accordingly, dependent apparatus claim 12 (which depends from independent claim 1) is not obvious in view of the combination of Guillard in view of Robert and further in view of Zarate, and should be allowed.

The Examiner also rejected dependent apparatus claim 12 as being unpatentable over Guillard, Bracque (871), Robert, and further in view of Zarate. However, for the reasons discussed above, the three-reference combination of Guillard, Robert, and Zarate does not teach Applicant's claimed apparatus 12, and therefore claim 12 is non-obvious. Bracque (871) does not cure the deficiencies of that three-reference combination, and therefore the four-reference combination cited by the Examiner also does not teach all of the elements and limitations of dependent claim 12, which should be allowed.

The problems addressed and solved by Applicant provide further support for the conclusion that Applicant's apparatus and methods in the amended pending claims are not obvious. Those problems, expressed in the form of "needs," are discussed in Applicant's application at page 3, line 1 to page 4, line 2.

In addition, the benefits and advantages of Applicant's claimed apparatus and methods provide additional support for the conclusion that the claimed apparatus and methods are not obvious. See, for example, the benefits discussed in Applicant's application at page 4, line 29 to page 5, line 3. See also the advantages discussed in the application at page 9, line 28 to page 10, line 2.

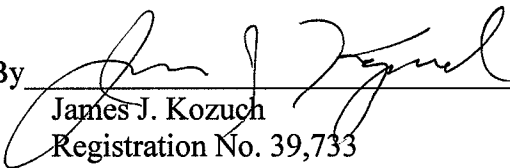
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CONCLUSION

Applicant believes that the foregoing constitutes a complete and full response to the final Office Action dated July 23, 2010. In view of the amendments and the remarks above, the present application is in condition for allowance and a Notice to that effect is respectfully solicited.

Should the Examiner deem that any action on the part of Applicant would advance prosecution, the Examiner is invited to telephone Applicant's attorney.

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